

IN THE CLAIMS:

Delete claims 16, 17, 43 and 44.

Please amend claims 1-3, 6, 22, 23, 24, 29, 30, 31, 33-40, 48, 49 and 51-60, and add new claims 61 and 62 as follows:

1. (currently amended) An apparatus for assessing physiological function in an individual comprising:

a sensor, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator configured to generate a stimulus and apply said stimulus to stimulate a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes configured to detect a signal response signals generated in response to said stimulus;

wherein said sensor comprises a connector extending between and connecting said stimulator and said detector and configured to automatically position said detector substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site, said connector including embedded electrical conductors connecting said stimulator and said detector;

and further wherein said sensor comprises a processor connected to said detector for processing ~~said at least one signal from said detector to select at least one electrode detecting at least one~~ said response signals generated in response to said stimulus, said processor being adapted to selectively process said response signals to provide a signal characteristic of said second anatomical site.

2. (currently amended) An apparatus for assessing physiological function in an individual comprising:

a sensor, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator configured to generate a stimulus and apply said stimulus to stimulate a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes configured to detect ~~a signal~~ response signals generated in response to said stimulus;

wherein said sensor comprises a processor ~~for processing said at least one signal from said detector to select from said plurality of electrodes at least one electrode detecting at least one signal~~ coupled to said detector for processing said response signals and selecting from said response signals at least one response signal characteristic of said second anatomical site.

3. (currently amended) An apparatus for assessing physiological function in an individual comprising:

a sensor, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator configured to generate a stimulus and apply said stimulus to stimulate a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes each configured to detect a signal generated in response to said stimulus; and

~~wherein said sensor comprises a connector configured~~ flexible connecting means structurally connecting said stimulator to said detector with said stimulator and detector being spaced a predetermined distance from one another, said connecting means including electrical conductors coupled to said stimulator and said detector, said connecting means being shaped so as to automatically position said detector

substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site.

4. (original)           The apparatus of claim 3 wherein said sensor is shaped to fit a lower extremity of said individual.

5. (original)           The apparatus of claim 4 wherein said lower extremity comprises the foot.

6. (currently amended)   The apparatus of claim 3 further comprising a processor ~~, said processor~~ coupled to said detector for processing ~~said~~ at least one signal from ~~said detector to select at least one electrode detecting at least one signal generated~~ in response to said stimulus that is characteristic of said second anatomical site.

7. (original)           The apparatus of claim 3 wherein said physiological function comprises nerve conduction.

8. (original)           The apparatus of claim 7 wherein said nerve conduction comprises conduction of the tibial nerve.

9. (original)           The apparatus of claim 7 wherein said nerve conduction comprises conduction of the peroneal nerve.

10. (original)           The apparatus of claim 3 wherein said stimulator comprises a shape to fit said first anatomical site, wherein said first anatomical site comprises a superficial location over the peroneal nerve, and said detector comprises a shape to fit said second anatomical site, wherein said second anatomical site comprises a superficial location over the extensor digitorum brevis muscle of the foot.

11. (original)        The apparatus of claim 3 wherein said stimulator comprises a shape to fit said first anatomical site, wherein said first anatomical site comprises a superficial location over the tibial nerve, and said detector comprises a shape to fit said second anatomical site, wherein said second anatomical site comprises a superficial location over the abductor hallucis muscle of the foot.
12. (original)        The apparatus of claim 3 wherein said first anatomical site comprises the ankle ipsilateral to said second anatomical site.
13. (original)        The apparatus of claim 3 further comprising a positioning indicator for location over a third anatomical site.
14. (original)        The apparatus of claim 11 wherein said third anatomical site comprises the malleolus of the ankle joint.
15. (original)        The apparatus of claim 14 wherein said malleolus is ipsilateral to said second anatomical site.
16. (canceled)
17. (canceled)
18. (original)        The apparatus of claim 3 wherein said electrodes comprise an electrode array in communication with a processor.
19. (original)        The apparatus of claim 18 wherein said electrode array comprises at least two independent interleaved bipolar recording elements.

20. (original)            The apparatus of claim 3 wherein said signal comprises a compound muscle action potential.
21. (original)            The apparatus of claim 20 wherein said compound muscle action potential is recorded over a motor point.
22. (currently amended)            The apparatus of claim 3 wherein the weighted sum of the recordings of at least two of said electrodes comprises the detectable signal.
23. (currently amended)            A method for assessing physiological function in an individual, comprising:
- (a)    placing a sensor on an individual, said sensor comprising a stimulator, a detector, and a flexible connector formed integral with and serving as a mechanical and electrical connection between said stimulator and said detector:
- a said stimulator being shaped to fit a first anatomical site, ~~said stimulator and~~ configured to generate a stimulus and apply said stimulus to stimulate a nerve at said first anatomical site; and
- a said detector being shaped to fit a second anatomical site, said detector comprising a plurality of electrodes each configured to detect ~~at least one~~ a response signal generated at said second anatomical site in response to said stimulus; and
- ~~wherein said sensor comprises a~~ said connector being configured to automatically position said detector substantially adjacent to said second anatomical site when said stimulator is placed substantially adjacent to said first anatomical site on the surface of an individual; and
- (b)    performing nerve conduction studies with at least one of said electrodes to assess physiological function in an individual.

24. (currently amended) The method of claim 23 further comprising wherein said nerve conduction studies comprises:

(c) ~~processing said at least one signal~~ the response signals generated detected by said electrodes at said second anatomical site to select at least one electrode detecting said at least one signal characteristic of said second anatomical site;

(d) ~~selecting at least one electrode in response to said processing according to step (c) from said plurality of electrodes;~~ determining from said response signals processed in step (c) at least one electrode detecting a response signal characteristic of said second anatomical site; and

(e) performing said nerve conduction studies of step (b) with said at least one electrode selected in step (d).

25. (original) The method of claim 23 wherein said nerve conduction studies comprise measurement of an F-wave latency.

26. (original) The method of claim 23 wherein said nerve conduction studies comprise measurement of a motor latency.

27. (original) The method of claim 23 wherein said nerve conduction studies comprise measurement of a sensory latency.

28. (original) The method of claim 23 wherein said nerve conduction studies comprise measurement of a sensory amplitude.

29. (currently amended) The method of claim 24 wherein said processing ~~further~~ comprises amplitude comparison between a plurality of response signals generated at said second anatomical site.

30. (currently amended)            The method of claim 24 wherein said processing comprises frequency spectrum comparison between a plurality of response signals generated at said second anatomical site.
31. (currently amended)            The method of claim 23 wherein ~~said~~ at least one response signal generated at said second anatomical site comprises peripheral evoked potentials.
32. (original)                        The method of claim 29 wherein said amplitude comparison comprises maximal peak to peak amplitude.
33. (currently amended)            The method of claim 30 wherein said frequency spectrum comparison comprises discrete Fourier transform analysis of said plurality of response signals generated at said second anatomical site and comparison of the spectral components of said plurality of response signals.
34. (currently amended)            The method of claim 33 wherein ~~said~~ selected electrodes comprise electrodes with more energy at low frequencies.
35. (currently amended)            The method of claim 23 wherein ~~said~~ at least one signal generated at said second anatomical site comprises compound muscle action potential.
36. (currently amended)            The method of claim 23 wherein ~~said~~ at least one signal generated at said second anatomical site is recorded over a motor point.
37. (currently amended)            An apparatus for assessing physiological function in an individual, comprising:

stimulus means for producing a stimulus and for applying the stimulus at a first anatomical site to stimulate a nerve;

detecting means comprising a plurality of electrodes for detecting at least one response signal characteristic of a second anatomical site generated in response to said stimulus; and

connecting means for connecting said stimulus means and said detecting means, ~~and~~ said connecting means being configured to automatically position said detecting means substantially adjacent said second anatomical site when said stimulating means are positioned substantially adjacent said first anatomical site;

said apparatus comprising multiple layers of materials including a flexible base layer that forms part of said stimulus means, said detecting means and said connecting means.

38. (currently amended)            The apparatus of claim 37 further comprising:  
electrical processing means for processing said at least one response signal ~~from~~  
detected by said detecting means.

39. (currently amended)            An apparatus for assessing physiological function  
in an individual comprising:

a sensor, said sensor comprising:

a stimulator for generating a nerve stimulus, said stimulator being shaped to fit  
a first anatomical site, ~~said stimulator generating a stimulus whereby application of~~  
~~and apply~~ said stimulus stimulates a nerve at said first anatomical site; ~~and~~

a detector shaped to fit a second anatomical site, said detector comprising a  
plurality of electrodes for detecting ~~a signal~~ signals generated at said second site in  
response to said stimulus; and

connector means formed integral with and structurally and electrically  
connecting said stimulator and detector, said connector means being shaped to  
~~wherein said sensor automatically positions~~ position said detector substantially



adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site;

~~wherein said physiological function comprises~~ comprising nerve conduction; and ~~wherein said nerve conduction comprises~~ conduction of the tibial nerve.

40. (currently amended) An apparatus for assessing physiological function in an individual comprising:

a sensor, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a ~~signal~~ signals generated at said second site in response to said ~~stimulus~~ stimulation of a nerve at said first anatomical site;

flexible connecting means structurally connecting said stimulator to said detector with said stimulator and detector being spaced a predetermined distance from one another, said connecting means including electrical conductors coupled to said stimulator and said detector, said connecting means being shaped so as to automatically position ~~wherein said sensor automatically positions~~ said detector substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site;

~~wherein said physiological function comprises nerve conduction; and wherein said nerve conduction comprises~~ comprising conduction of the peroneal nerve.

41. (previously presented) An apparatus for assessing physiological function in an individual comprising:

a sensor, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a signal generated in response to said stimulus;

wherein said sensor automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site; and

wherein said stimulator comprises a shape to fit said first anatomical site, wherein said first anatomical site comprises a superficial location over the peroneal nerve, and said detector comprises a shape to fit said second anatomical site, wherein said second anatomical site comprises a superficial location over the extensor digitorum brevis muscle of the foot.

42. (previously presented)      An apparatus for assessing physiological function in an individual comprising:

a sensor, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a signal generated in response to said stimulus;

wherein said sensor automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site; and

wherein said stimulator comprises a shape to fit said first anatomical site, wherein said first anatomical site comprises a superficial location over the tibial nerve, and said detector comprises a shape to fit said second anatomical site,

wherein said second anatomical site comprises a superficial location over the abductor hallucis muscle of the foot.

43. (canceled)

44. (canceled)

45. (previously presented)      An apparatus for assessing physiological function in an individual comprising:

    a sensor, said sensor comprising:

        a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

        a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a signal generated in response to said stimulus;

        wherein said sensor automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site; and

        wherein said first anatomical site comprises the ankle ipsilateral to said second anatomical site.

46. (previously presented)      An apparatus for assessing physiological function in an individual comprising:

    a sensor, said sensor comprising:

        a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

        a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a signal generated in response to said stimulus;

wherein said sensor automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site; and  
wherein said signal comprises a compound muscle action potential.

47. (previously presented)      The apparatus of claim 46 wherein said compound muscle action potential is recorded over a motor point.

48. (currently amended)      A method for assessing physiological function in an individual, comprising:

(a) ~~placing a sensor on an individual, said~~ providing a sensor comprising:  
a stimulator for generating a nerve stimulus, said stimulator being shaped to fit  
a first anatomical site, ~~said stimulator generating a stimulus~~ whereby application of  
said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a  
plurality of electrodes ~~for detecting at least one~~ each capable of detecting a signal  
generated at said second anatomical site in response to said stimulus applied at said  
first anatomical site; and

flexible connector means connecting said stimulator to said detector to form an  
integral structure;

~~wherein said sensor automatically positions~~ said connector means being  
shaped to automatically position said detector substantially adjacent to said second  
anatomical site when said stimulator is placed substantially adjacent said first  
anatomical site on the surface of an individual;

(b) placing said sensor on an individual so that said stimulator is located at  
and fits said first anatomical site and said detector is located at and fits said second  
anatomical site; and

(b) (c) performing nerve conduction studies with said sensor at least one  
electrode to assess physiological function in an individual, said studies comprising (1)

causing said stimulator to generate a stimulus on said individual at said first anatomical site, (2) causing said electrodes of said detector to detect response signals generated at said second anatomical site in response to said stimulus applied at said first anatomical site, and (3) evaluating said response signals;

~~(e)~~ (d) ~~processing said at least one signal~~ the response signals generated at said second anatomical site and detected by said electrodes to select at least one electrode detecting ~~said at least one~~ a response signal characteristic of said second anatomical site; and

~~(d)~~ ~~selecting at least one electrode in response to said processing according to step (c) from said plurality of electrodes; and~~

~~(e)~~ performing the nerve conduction studies of specified in step (b) ~~(c)~~ with said ~~the~~ at least one electrode selected in step (d).

49. (currently amended)                      The method of claim 48 wherein said processing further comprises amplitude comparison between a plurality of response signals generated at said second anatomical site.

50. (previously presented)                      The method of claim 49 wherein said amplitude comparison comprises maximal peak to peak amplitude.

51. (currently amended)                      The method of claim 48 wherein said processing comprises frequency spectrum comparison between a plurality of response signals generated at said second anatomical site.

52. (currently amended)                      The method of claim 51 wherein said frequency spectrum comparison comprises discrete Fourier transform analysis of said plurality of response signals generated at said second anatomical site and comparison of the spectral components of said response signals.

53. (currently amended) The method of claim 52 wherein said at least one selected electrodes- electrode comprises electrodes with more energy at low frequencies.

54. (currently amended) The method of claim 48 wherein each of said at least one signal response signals generated at said second anatomical site comprises peripheral evoked potentials.

55. (currently amended) A method for assessing physiological function in an individual, comprising:

(a) placing a sensor on an individual, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a at least one signal generated at said second site in response to said stimulus; and

a flexible connector means connecting said stimulator to said detector so as to form an integrated structure;

wherein said ~~sensor~~ flexible connector means automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is placed substantially adjacent said first anatomical site on the surface of an individual; and

(b) performing nerve conduction studies with at least one electrode to assess physiological function in an individual by causing said stimulator to generate a stimulus to a nerve at said first site, causing said electrodes of said detector to detect a response signal generated at said second site in response to said stimulus, and processing and measuring said response signals;

wherein said nerve conduction studies comprise measurement of an F-wave latency.

56. (currently amended)                    A method for assessing physiological function in an individual, comprising:

(a)     placing a sensor on an individual, said sensor comprising:  
         a stimulator shaped to fit a first anatomical site, said stimulator  
generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

         a detector shaped to fit a second anatomical site, said detector  
comprising a plurality of electrodes for detecting a at least one response signal  
generated at said second site in response to said stimulus;

         wherein said sensor automatically positions said detector substantially  
adjacent to said second anatomical site when said stimulator is placed substantially  
adjacent said first anatomical site on the surface of an individual; and

(b)     performing nerve conduction studies with at least one electrode to  
assess physiological function in an individual by causing said stimulator to generate a stimulus to a nerve at said first site, causing said electrodes of said detector to detect a response signal generated at said second site in response to said stimulus, and processing and measuring said response signals;

         wherein said nerve conduction studies comprise measurement of a motor latency.

57. (currently amended)                    A method for assessing physiological function in an individual, comprising:

(a)     placing a sensor on an individual, said sensor comprising:  
         a stimulator shaped to fit a first anatomical site, said stimulator  
generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a at least one response signal generated at said second anatomical site in response to said stimulus;

wherein said sensor automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is placed substantially adjacent said first anatomical site on the surface of an individual; and

(b) performing nerve conduction studies with at least one electrode to assess physiological function in an individual by causing said stimulator to generate a stimulus to a nerve at said first site, causing said electrodes of said detector to detect a response signal generated at said second site in response to said stimulus, and processing and measuring said response signals;

wherein said nerve conduction studies comprise measurement of a sensory latency.

58. (currently amended)                      A method for assessing physiological function in an individual, comprising:

(a) placing a sensor on an individual, said sensor comprising:  
a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a at least one response signal generated in response to said stimulus;

wherein said sensor automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is placed substantially adjacent said first anatomical site on the surface of an individual; and

(b) performing nerve conduction studies with at least one electrode to assess physiological function in an individual by causing said stimulator to generate a stimulus to a nerve at said first site, causing said electrodes of said detector to detect



a response signal generated at said second site in response to said stimulus, and processing and measuring said response signals;

wherein said nerve conduction studies comprise measurement of a sensory amplitude.

59. (currently amended)                      A method for assessing physiological function in an individual, comprising:

(a)     placing a sensor on an individual, said sensor comprising:  
         a stimulator shaped to fit a first anatomical site, said stimulator  
generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

         a detector shaped to fit a second anatomical site, said detector  
comprising a plurality of electrodes for detecting a response ~~at least one~~ signal  
generated in response to said stimulus;

         wherein said sensor automatically positions said detector substantially  
adjacent to said second anatomical site when said stimulator is placed substantially  
adjacent said first anatomical site on the surface of an individual; and

(b)     performing nerve conduction studies with at least one electrode to  
assess physiological function in an individual by causing said stimulator to generate a stimulus to a nerve at said first site, causing said electrodes of said detector to detect a response signal generated at said second site in response to said stimulus, and processing and measuring said response signals;

         wherein said ~~at least one signal~~ response signals generated at said second anatomical site ~~comprises~~ comprise compound muscle action potential.

60. (currently amended)                      A method for assessing physiological function in an individual, comprising:

(a)     placing a sensor on an individual, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site; and

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting a response ~~at least one~~ signal generated in response to said stimulus;

wherein said sensor automatically positions said detector substantially adjacent to said second anatomical site when said stimulator is placed substantially adjacent said first anatomical site on the surface of an individual; and

(b) performing nerve conduction studies with at least one electrode to assess physiological function in an individual by causing said stimulator to generate a stimulus to a nerve at said first site, causing said electrodes of said detector to detect a response signal generated at said second site in response to said stimulus, and processing, recording and measuring said response signals;

wherein said at least one signal generated at said second anatomical site is detected by an electrode situated ~~recorded over~~ a motor point.

61. (new) An apparatus for assessing physiological function in an individual comprising:

a sensor, said sensor comprising:

a stimulator shaped to fit a first anatomical site, said stimulator generating a stimulus whereby application of said stimulus stimulates a nerve at said first anatomical site;

a detector shaped to fit a second anatomical site, said detector comprising a plurality of electrodes for detecting signals generated in response to said stimulus; and

flexible connecting means structurally connecting said stimulator to said detector with said stimulator and detector being spaced a predetermined distance from one another, said connecting means including electrical conductors coupled to

said stimulator and said detector, said connecting means being shaped so as to automatically position said detector substantially adjacent to said second anatomical site when said stimulator is positioned substantially adjacent to said first anatomical site;

said sensor being formed from multiple layers of material including a base layer in the form of a sheet of flexible plastic material and a layer of conductive traces connected to said stimulator and said electrodes, with said base layer forming an integral part of said stimulator, said detector and said flexible connecting means.

62. (new)                   Apparatus according to claim 61 wherein said sensor includes an electrical interface that also comprises said base layer, and further including an electronic controller coupled by said electrical interface to said stimulator and said electrodes, said controller being adapted to (a) cause said stimulator to generate a stimulus and (b) selectively receive and process response signals detected by said electrodes.